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PROPOSED PETITION DECISION OF THE OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD (PETITION FILE NO. 499)

INTRODUCTION

The Occupational Safety and Health Standards Board (Board) received a petition on October 15, 2007, from Dale H. Curtis (Petitioner), representing Curtis Engineering Corporation. The Petitioner requests the Board to amend Title 8, California Code of Regulations, Section 4884 of the General Industry Safety Orders (GISO), proposing restrictions on the use of hammerhead and luffing tower cranes older than 20 years.

Labor Code Section 142.2 permits interested persons to propose new or revised standards concerning occupational safety and health, and requires the Board to consider such proposals, and render a decision no later than six months following receipt. Further, as required by Labor Code Section 147, any proposed occupational safety or health standard received by the Board from a source other than the Division of Occupational Safety and Health (Division) must be referred to the Division for evaluation, and the Division has 60 days after receipt to submit a report on the proposal.

SUMMARY

The Petitioner is proposing that Section 4884 of the GISO be amended to provide that hammerhead[1] and luffing[2] tower cranes older than 20 years not be climbed and/or tied to any structure. Furthermore, he is also proposing that cranes older than 20 years only be used as freestanding tower cranes and that any tower cranes older than 30 years not be used on construction jobsites.

The Petitioner states that, except for a few contractor-owned tower cranes, most are owned by rental companies which enter into "bare-rental"[3] agreements with tower crane users (contractors). The crane owner/rental company usually supplies the technician, technical support and replacement component inventory. However, Mr. Curtis states that technical support on old tower cranes has been marginal, and replacement components for older cranes are often not readily available.

The Petitioner cited the following problems as being common to older tower cranes:

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[1] A hammerhead tower crane is a tower crane with a horizontal boom and a load trolley that traverses the boom to change the load radius (move the load horizontally).

[2] A luffing tower crane is a crane with a boom pinned to the superstructure at its inner end and containing load-hoisting tackle at its outer end and with a hoist mechanism to raise or lower the boom in a vertical plane to change load radius.

[3] "Bare rental" means to rent the crane without an operator.

1. Operating manuals for older tower cranes are often incomplete and do not show accurate values for foundation reaction forces and other forces needed for the engineer to design struts to tie-in to the adjacent structure.
2. The manufacturer's technical and service bulletins are often not included in the operation manual.
3. Technical support may be unavailable if the manufacturer is no longer in business.
4. The crane owner is not always able to furnish a competent technician for either climbing or dismantling the crane. The crane user/contractor may therefore have to locate a competent technician elsewhere.
5. The crane owner may not have high-wear original equipment manufacturer (OEM) replacement parts readily available. Thus, questionable material and salvage parts may be used to replace worn-out parts.
6. Owners of some older tower cranes write "bare-rental" contracts in which the crane user (contractor) assumes responsibility and liability for on-going maintenance, engineering for tie-in struts, climbing and dismantling expenses. Some crane users do not or are not financially able to take-on these responsibilities.
7. Almost all tower cranes which are climbed/raised to higher configurations are subsequently tied-in to the adjacent structure. Tie-in collars for old cranes often appear to be worn out and without new connection components. Some collars appear to have been salvaged from other tower cranes. Older collars may require engineering services to show additional strengthening necessary. Some engineering firms do not have the expertise to recognize these problems.
8. When cranes are climbed to increased heights, the old climbing cages and related components should be in "like-new" condition. It is almost impossible for crane owners to provide older climbing assemblies in good condition.
9. Many years of usage contribute to metal fatigue which can negatively affect the safe operation of tower cranes. The amount of fatigue in older tower cranes is not always evident without thorough examination.

In support of his request, the Petitioner gave as an example a 2007 incident in Long Beach where a 1983 model tower crane was climbed to a hook height of 387 feet and was tied to the building at two different elevations. The slewing gear assembly broke, and the crane had to be climbed down to a height of 255 feet, which was as high as a large assist crane could reach to either replace the slewing gear and/or dismantle the tower crane.

The Petitioner also provided a magazine article[4] about the construction boom in Moscow. The article reported that 20 and 30 year-old cranes are considered life-expired in Moscow and that local regulations prohibit their use in that city. The magazine also reports that this prohibition will soon extend throughout Russia.

For these reasons, the Petitioner believes that standards should be amended to prohibit the use of older cranes in California.

DIVISION'S EVALUATION

[4] Cranes Today magazine, www.cranestodaymagazine.com, August 2006, pages 23, 25, 27-28.

The Division's evaluation, dated and received on December 12, 2007, indicated that it is not aware of accidents as a result of aging tower cranes. Tower cranes are required to be inspected by a licensed crane-certifying agency as well as by the Division. In addition to the inspection, the annual certification must include detailed non-destructive testing of the critical tower crane parts. If safety deficiencies are found on the tower crane, the crane will not be certified until the deficiencies have been corrected.

The Division reported that a tower crane manufacturer's representative was contacted regarding the condition of older tower cranes, and the representative indicated that the condition of a crane is more dependent on how well it is maintained, rather than its age. Furthermore, the Division noted that older cranes are generally designed more conservatively (i.e., "overbuilt") than newer cranes which are computer-designed; thus older cranes may have longer service lives.

The crane certification program and the permitting system used by Cal/OSHA have been effective in preventing accidents involving tower cranes. If there are older tower cranes with safety deficiencies, they can be handled on an individual basis with the existing standards. Therefore, the Division recommends that the petition be denied.

STAFF'S EVALUATION

GISO Articles 96, 99 and 100 require tower cranes in California to be inspected by a licensed crane-certifying agency with oversight by the Division. In addition to the inspection, the annual and quadrennial certification may include detailed non-destructive testing of the critical tower crane parts where considered necessary by the certifying agency and whenever practical and advisable to avoid disassembly of equipment, removal of pins, etc. If safety deficiencies are found on the tower crane, the crane may not be certified until the deficiencies have been corrected as determined by the certifying agency.

Board staff agrees with the Division that age alone does not determine whether a crane can continue to be operated safely. A well maintained crane, used infrequently and in light service can be expected to last much longer than a poorly maintained crane in heavy service. Likewise, a crane that has been operated or stored in a corrosive (e.g., salt-air) atmosphere and not properly maintained may also have a shorter life expectancy.

GISO Article 100, Inspection and Maintenance, Section 5031, requires periodic inspections (quarterly, annual and quadrennial). Furthermore, periodic inspections are required at intervals not exceeding 750 hours of crane operation. Thus, safety defects are likely to be discovered in a timely manner within the existing inspection and maintenance framework.

Board staff agrees with the Division that the crane certification program and the permitting system used by Cal/OSHA appear to have been effective in preventing accidents involving mechanical failure of tower cranes.

With respect to the problems listed by the petitioner:

1. *Incomplete operating manuals:* American Society of Mechanical Engineers (ASME) B30.3-1996, Section 3-1.4, requires documentation including installation and anchorage arrangements. Similar requirements are found in GISO Section 4965(b). Thus, existing standards effectively prohibit the use of cranes absent this information. If certifiers have encountered difficulty enforcing this provision, the Division may wish to consider whether a clarifying directive is needed.
2. *Missing technical and service bulletins:* If this is a serious problem, Board staff is of the opinion that authority exists within the provisions of ASME B30.3-1996, Section 3-1.4, and GISO Section 4965(b) for the certifier and/or the Division to require they be provided.
3. *Lack of technical support:* GISO Sections 4884 and 4965(i) require proper installation of tower cranes. If necessary support is unavailable, this may be grounds to deny certification of the crane.
4. *Competent technicians for erection and dismantling:* See item #3, above.
5. *Lack of, or suitability of, replacement parts:* GISO Section 4884 requires compliance with the applicable ASME Standard. ASME B30.3-1996, Section 3-2.3.1(b) states that replacement parts should ordinarily be obtained from the OEM, or be at least equal to the OEM specifications.
6. *Responsibility and liability:* These issues are not necessarily limited to older tower cranes.
7. *Questionable tie-in collars:* This is related to item #5 above. Engineering expertise and practicing outside the engineer's area of expertise is covered by Title 8, Division 1, Chapter 3.2, Article 11 and also by the Business and Professions Code.
8. *Strength of components for high-rise installations:* This is related to item #5 above. It is also the responsibility of the crane certification agency to assure safe installation.
9. *Metal fatigue:* Fatigue is a function not only of age, but also of service. An arbitrary age limit would not necessarily address this problem. Fatigue is addressed by existing standards, including GISO Sections 5022(d)(14), 5031(d)(4) and Group 13, Plate V, which require both visual and nondestructive testing of component parts as necessary.

Some of the problems mentioned by the Petitioner appear to relate to qualifications of certified agents and the quality of their inspections. Other problems concern questions about strength and suitability of crane components and replacement parts. All of these are enforcement-related problems. Board staff is of the opinion that older tower cranes with safety deficiencies can be handled on an individual basis within the existing standards.

Establishing age-based criteria for taking cranes out of service is an arbitrary attempt to improve crane safety and would have no affect on newer cranes in heavy service and or those which are not properly maintained. Furthermore, it might tend to serve as a disincentive for owners to maintain cranes as they approach 20 or 30 years of age. The current standards permit continued operation of cranes provided they are proven by inspections and testing to be capable of doing so safely.

Board staff is of the opinion that existing inspection, testing and certification requirements of GISO Articles 96, 99 and 100 have been effective in assuring crane safety and that the necessity for age-based retirement of cranes has not been proven. Board staff therefore recommends that

the petition be denied. However, the Petitioner is encouraged to work with the Division to ensure certification quality control and to ensure effective application of existing standards.

CONCLUSION AND ORDER

The Occupational Safety and Health Standards Board has considered the petition of Dale H. Curtis, representing Curtis Engineering Corporation, to make recommended changes to Section 4884, proposing restrictions on the use of hammerhead and luffing tower cranes older than 20 years. The Board has also considered the recommendations of the Division and Board staff. For reasons stated in the preceding discussion, the Petition is hereby denied.